Joint meeting of the Dutch and Belgian Societies for Parasitology 'challenges for the control of parasites'

Abstract

The effect of *Giardia duodenalis* on bovine monocyte-derived dendritic cells and T-cell responses *in vitro*.

Grietje H. Grit[1], Bert Devriendt[1], Stefanie Van Coppernolle[1], Thomas Geurden[1], Ely Bénére[2], Jayne Hope[3], Peter Geldhof[1], Eric Cox[1], Jozef Vercruysse[1], Louis Maes[2], Edwin Claerebout[1]

[1]Department of Virology, Parasitology and Immunology, Faculty of Veterinary Medicine, University of Ghent
[2]Department of Biomedical Sciences, Laboratory for Microbiology, Parasitology and Hygiene, University of Antwerp
[3]Roslin Institute and R(D)SVS, University of Edinburgh

Giardia duodenalis is an important intestinal parasite in animals and humans. Knowledge on the immune response against *Giardia* is indispensible for the development of a vaccine. Although dendritic cells are important in the initial phase of the immune response, the role of dendritic cells in the immunity against *G. duodenalis* is poorly documented and has only been studied in the mouse, which is not a natural host for this parasite.
In this study we addressed the effect of *G. duodenalis* trophozoites and excretion/secretion (ES) material on bovine monocyte-derived dendritic cells (MoDCs) and we examined the ability of stimulated DC to induce a T-cell response *in vitro*. In three experiments with 4 calves each, MoDCs were incubated with different numbers of live *Giardia* trophozoites or concentrations of ES material. None of the MoDC maturation markers (CD40, CD80 and MHC-II) were upregulated and no significant production of IL-4, IL-6, IL-10, IL-12 or TNF-α was measured in MoDC cultures after stimulation with *Giardia.* However, a dose-dependent decrease of ovalbumin uptake was observed in MoDCs incubated with trophozoites, suggesting functional maturation.
MoDCs stimulated with *Giardia* trophozoites induced a dose-dependent proliferation of allogenic peripheral blood mononuclear cells, which were depleted for antigen presenting cells. Fluorescent labeling of the proliferating cells with PKH showed that mainly $CD3^+$ αβ-T-cells were expanding, including both $CD4^+$ and $CD8^+$ T-cells. When $CD4^+$ T-cells were incubated with *Giardia*-stimulated MoDC, higher levels of IFN-γ and lower levels of IL-10 were produced, compared to T-cells that were incubated with unstimulated MoDC.
Our data show that *G. duodenalis* trophozoites activate bovine MoDCs *in vitro* and cause a state of semi-maturation, capable of inducing T-cell proliferation. A broader panel of cytokines will be measured to determine the phenotype of the induced immune response.